



**Armed Forces College of
Medicine
AFCM**





Pathology of muscle and soft tissue diseases

Dr. Dalia Abd El-Kareem

Lecturer of Pathology

INTENDED LEARNING OBJECTIVES (ILO)



By the end of this lecture the student will be able to:

1. Identify common hereditary bone lesions.
2. Understand basic facts related to inflammatory myopathies.
3. Identify the pathogenesis of myasthenia gravis.
4. List types of muscular dystrophy
5. Classify soft tissue tumors
6. Describe pathology of lipoma and fibroma
7. Discuss pathology of hemangioma and lymphangioma



Lecture Plan



1. Part 1 (5 min) Introduction
2. Part 2 (35 min) Main lecture
3. Part 3 (5 min) Summary
4. Lecture Quiz (5 min)



DISORDERS OF BONE GROWTH & DEVELOPMENT



These include both local and systemic disorders.

□ **Local defects**: *Involve a single bone or a group of bones such as: (e.g. syndactyly), and (e.g. supernumerary ribs).*

□ **systemic disorders**:

- *Achondroplasia (disorder of chondroblasts),
- *Osteogenesis imperfecta (disorder of osteoblasts),
- *Osteopetrosis (disorder of osteoclasts)
- *Foetal rickets (disorder of mineralisation).

Aetiology: Gene mutation; familial (hereditary), or sporadic.



Achondroplasia -1



Incidence: It is the most common form of dwarfism.



[https://
www.orthobullets.co
m/pediatrics/4094/
achondroplasia](https://www.orthobullets.com/pediatrics/4094/achondroplasia)



Achondroplasia -1



Clinical picture:

The limbs are short, but the trunk is of normal length.
Normal intelligence and lifespan.



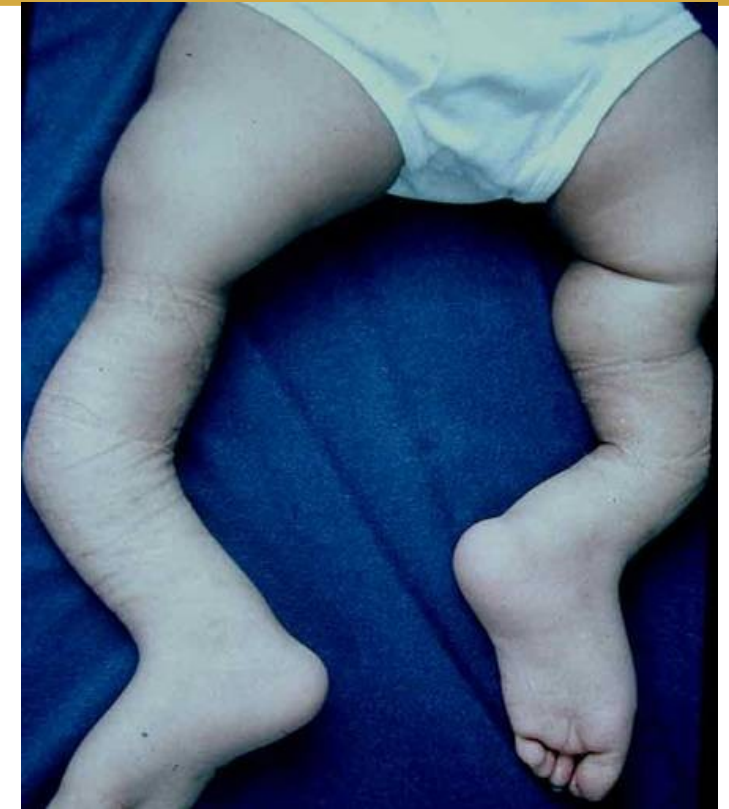
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Type I collagen disease, Osteogenesis-2 Imperfecta (Brittle bone disease)



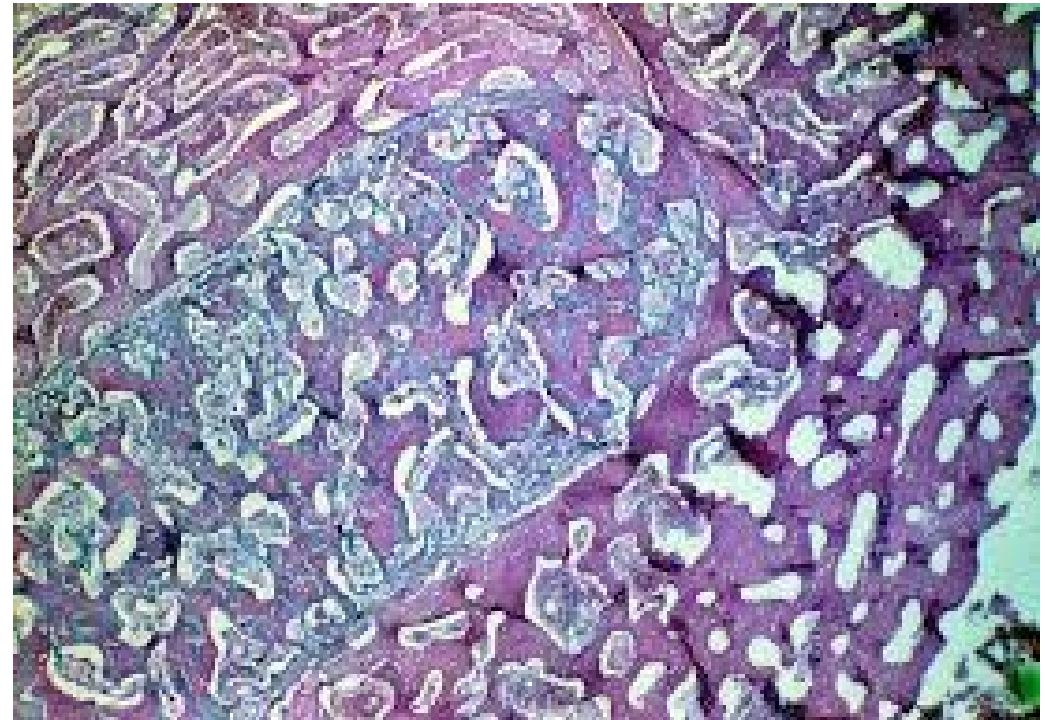
Definition: It is a group of genetic disorders caused by qualitatively or quantitatively abnormal type-I collagen synthesis .



Osteopetrosis (marble bone disease) -3



It is a genetic disorders characterized by *Failure of normal osteoclast resorptive function* of bone together with continued *bone formation* results in overgrowth of calcified dense bone



https://www.uaz.edu.mx/histo/pathology/ed/ch_26/c26_s26.htm





INFLAMMATORY MYOPATHIES

- It is an **autoimmune inflammation** of the skeletal muscle.
- It may involve muscle alone(e.g. Polymyositis) or
- muscles & other tissue; skin e.g. Dermatomyositis.
- It occurs in adults only (polymyositis) or both children and adults(Dermatomyositis) .





INFLAMMATORY MYOPATHIES

Clinical picture: It presents with bilateral **proximal** muscle weakness.

Microscopic : Lymphocytic inflammation and skeletal muscle fiber degeneration and regeneration.

Treatment: Patients respond to immunosuppression.

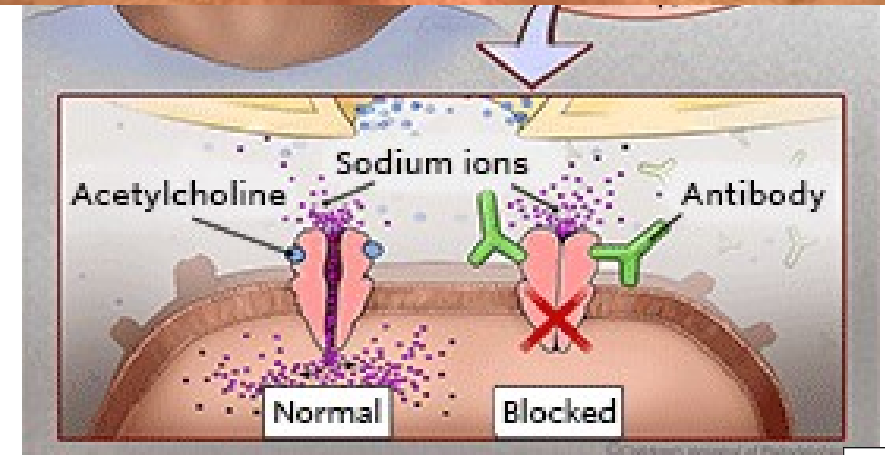


MYASTHENIA GRAVIS



Definition: It is an autoimmune disease characterized by autoantibodies against the **acetylcholine (ACh) receptor** of the neuromuscular junction → muscular weakness .

Incidence: Females are affected more frequently than males.



MYASTHENIA GRAVIS



Clinical picture:

- Extraocular muscle weakness → Eye lid ptosis and diplopia.
- Respiratory muscle involvement → Respiratory failure & death.
- There is an association with thymic hyperplasia and thymomas.

Treatment: Anticholinesterase agents, steroids, and thymectomy.



MUSCULAR DYSTROPHY



Duchenne muscular dystrophy:

It is a **recessive X-linked** disorder leading to **rapid** progression of muscle degeneration.

Incidence: It is the most common and severe form of muscular dystrophy.

Becker muscular

dystrophy:

It is a **recessive X-linked** inherited disorder leading to **slowly** progressive muscle weakness of the legs and pelvis.

Incidence: Less severe and less common than



Soft tissue tumors

- 1.They include mesenchymal tumors **other than bone and cartilage.**
 - 2.Current evidence indicates that these tumors arise from ***pluripotent mesenchymal cells*** and not mature mesenchymal cells.
- **Benign soft tissue tumors** are much more common.



Tumors of adipose tissue

- 1.Lipoma
- 2.Liposarcoma

Tumors of fibrous tissue

- 1.Fibroma
- 2.Fibrosarcoma

Tumors of smooth muscles

- 1.Leiomyoma
- 2.Leiomyosarcoma

Vascular tumors

- 1.Hemangioma*
- 2.Lymphangioma*
- 3.Hemangioendothelioma*
- 4.angiosarcoma*



TUMORS OF ADIPOSE TISSUE

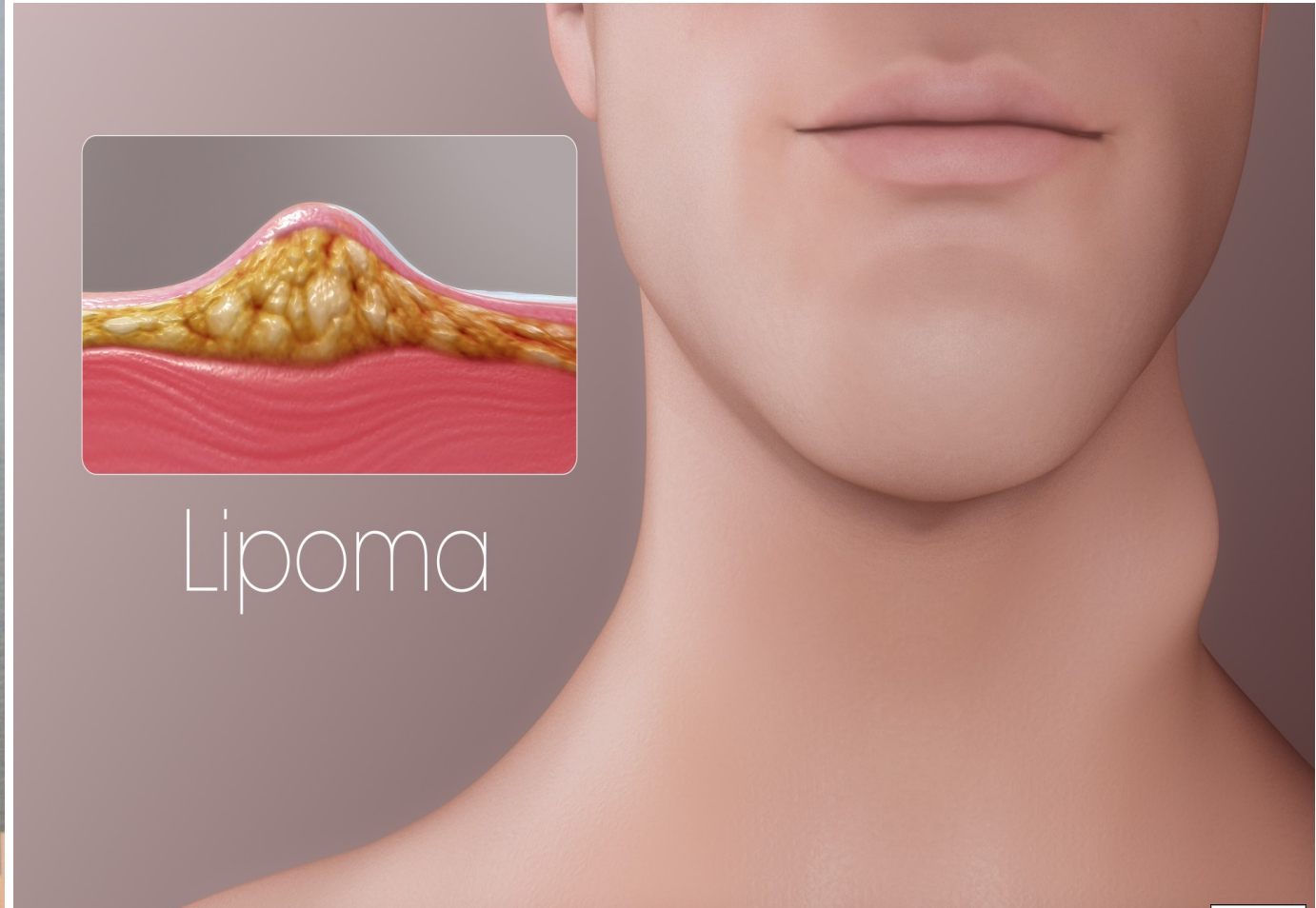
1. **Lipoma:** is the most common soft tissue tumor.

It is a slowly growing **benign** tumor of adipose tissue that arise from **subcutaneous fat**, intermuscular septae, breast, omentum, GIT.....

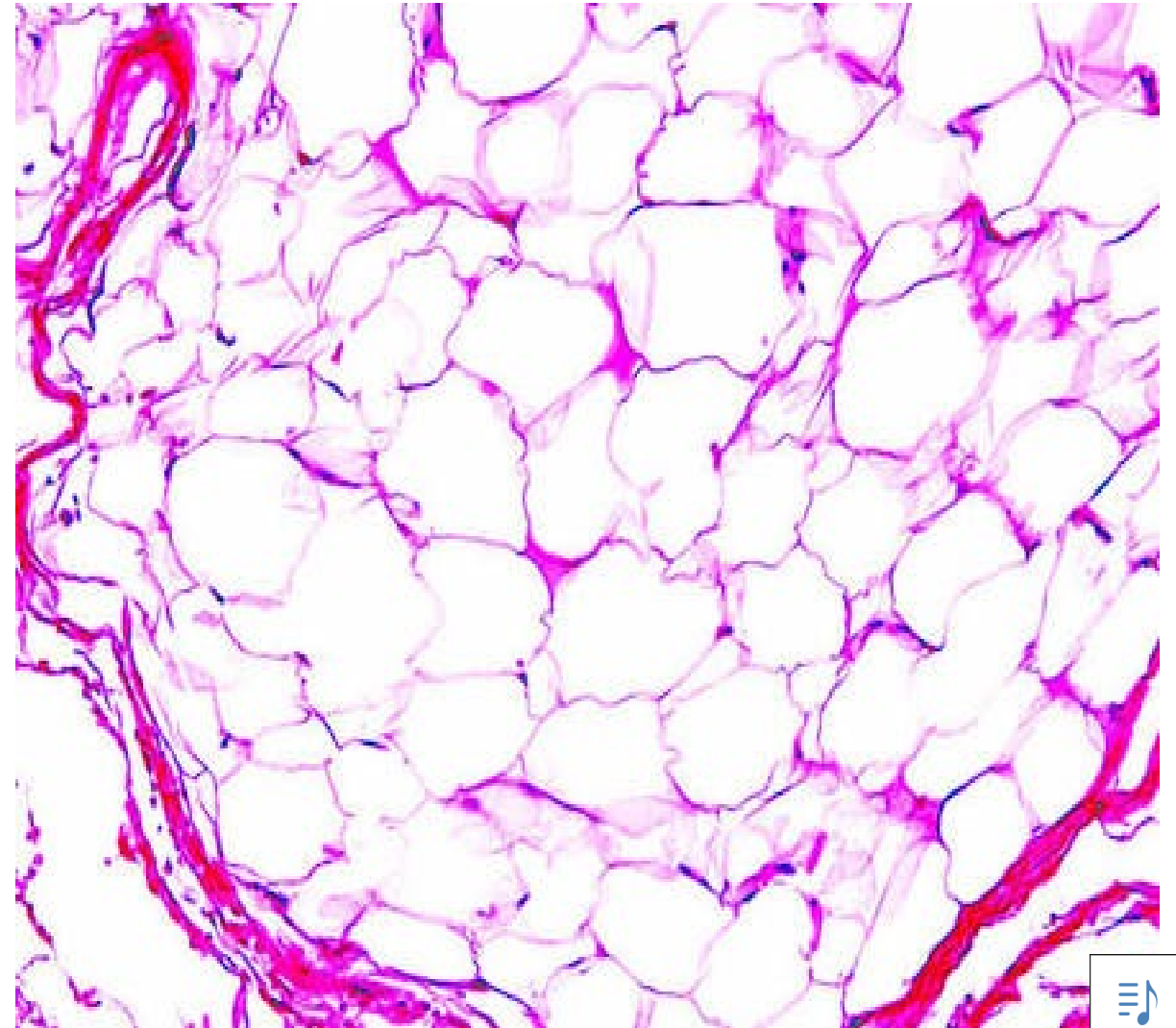
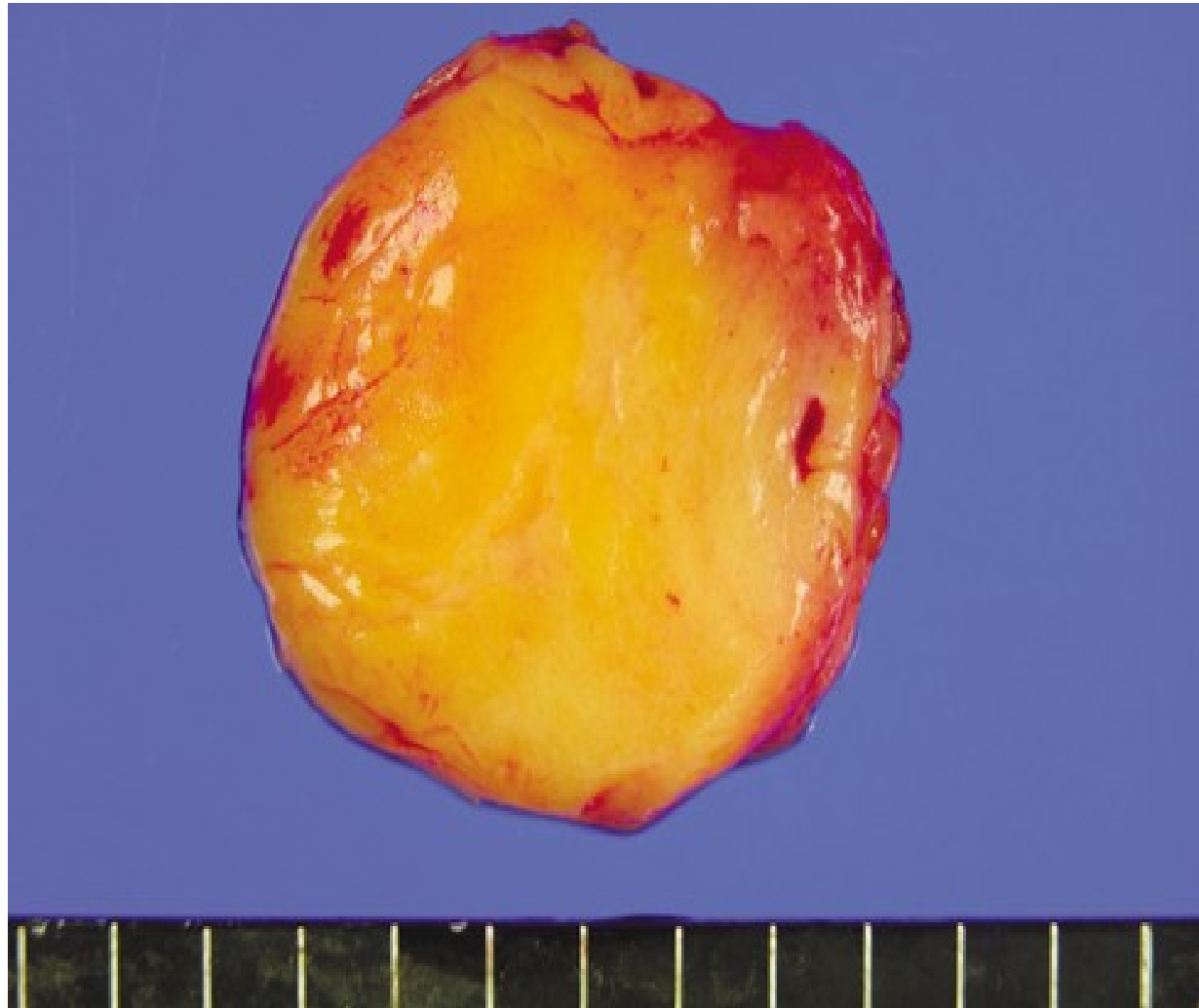
- **Gross picture:** **well defined** **capsulated** mass with **yellowish soft** lobulated greasy cut surface.
- **Microscopic picture:** **capsulated** with delicate vascularized fibrous septae dividing the tumor into **lobules formed of mature fat cells.**



LIPOMA



LIPOMA



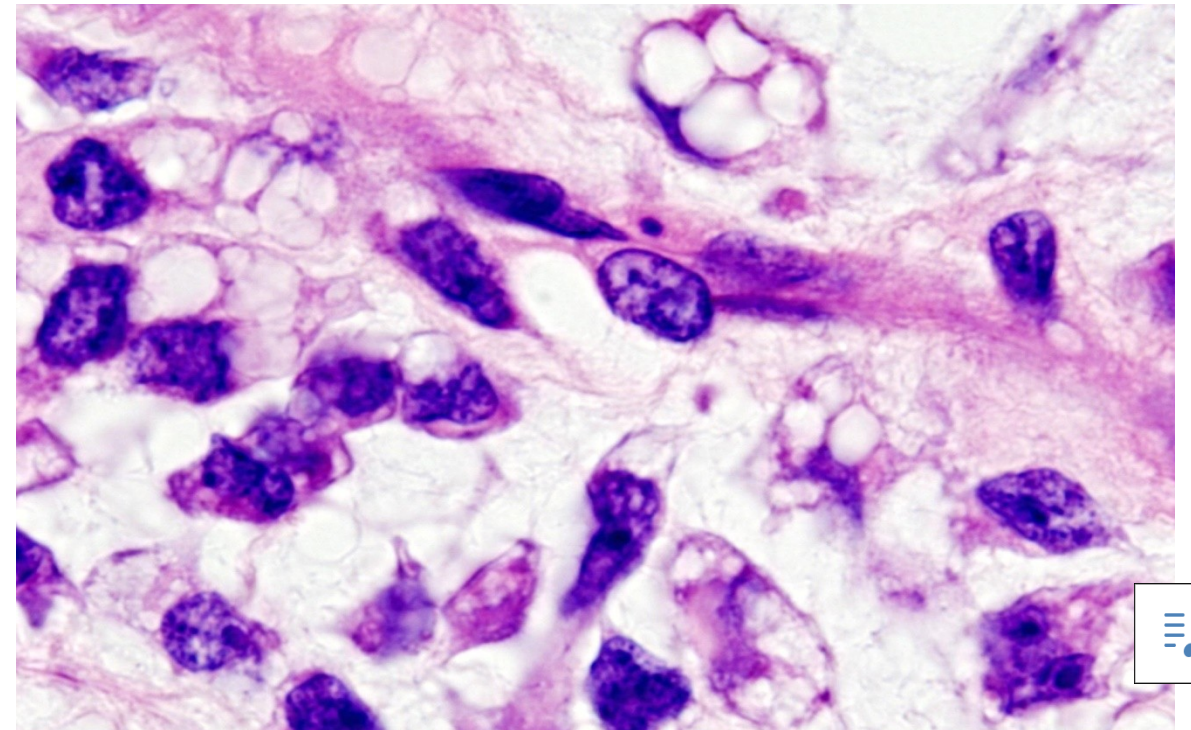
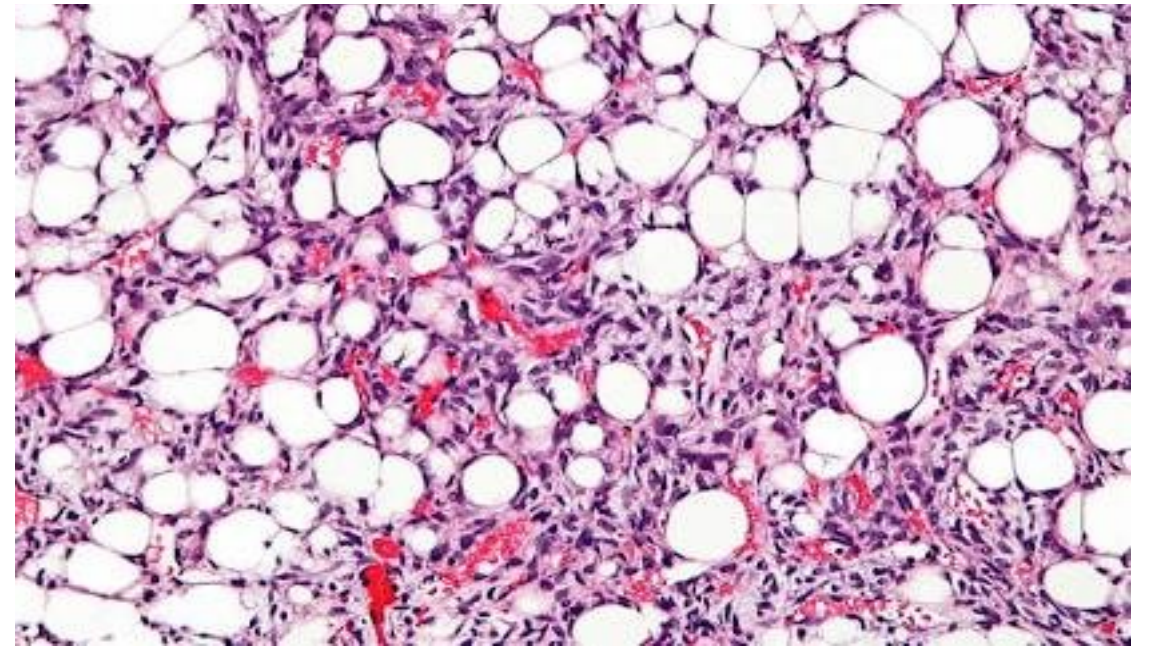
TUMORS OF ADIPOSE TISSUE

2. Liposarcoma: malignant tumor of adipose tissue.

- They occur in the **fifth to sixth decade**.
- They arise commonly in the **retroperitoneum** as relatively **large** well circumscribed masses, **non-capsulated** with glistening yellowish cut surface.



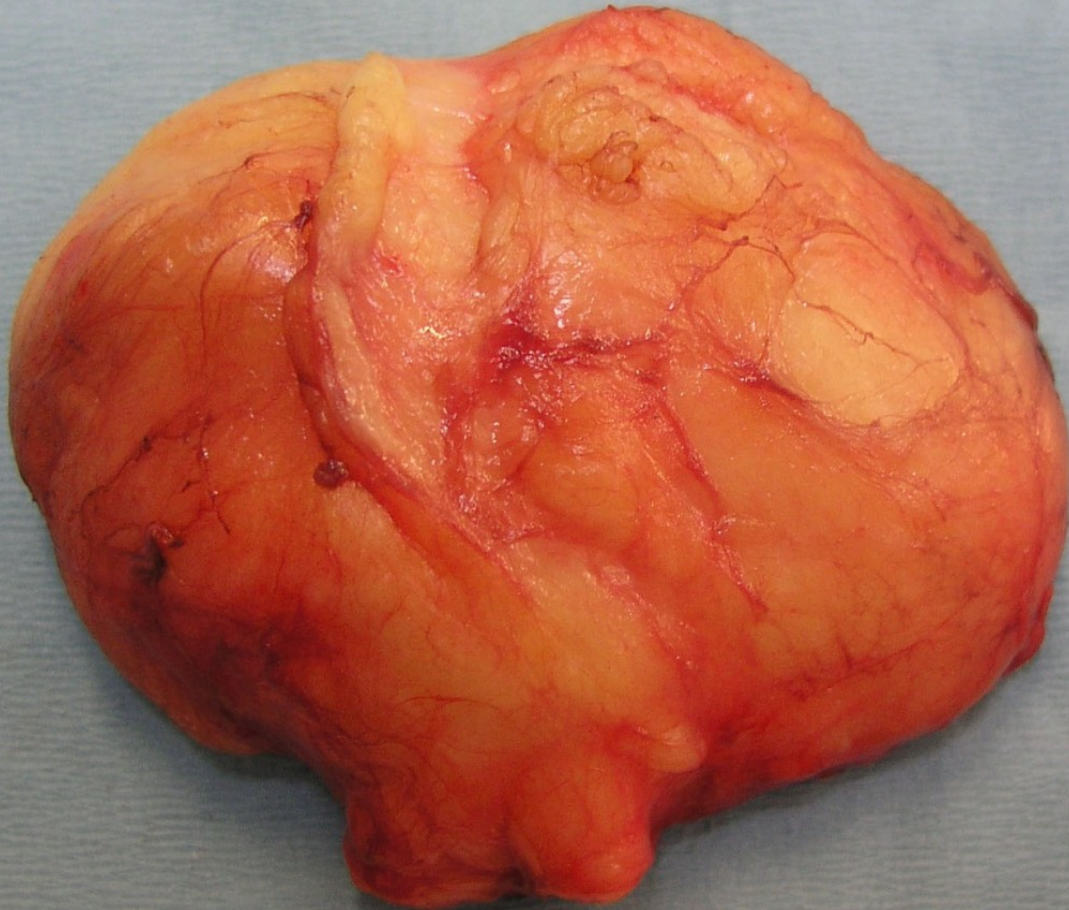
LIPOSARCOMA



TUMORS OF ADIPOSE TISSUE

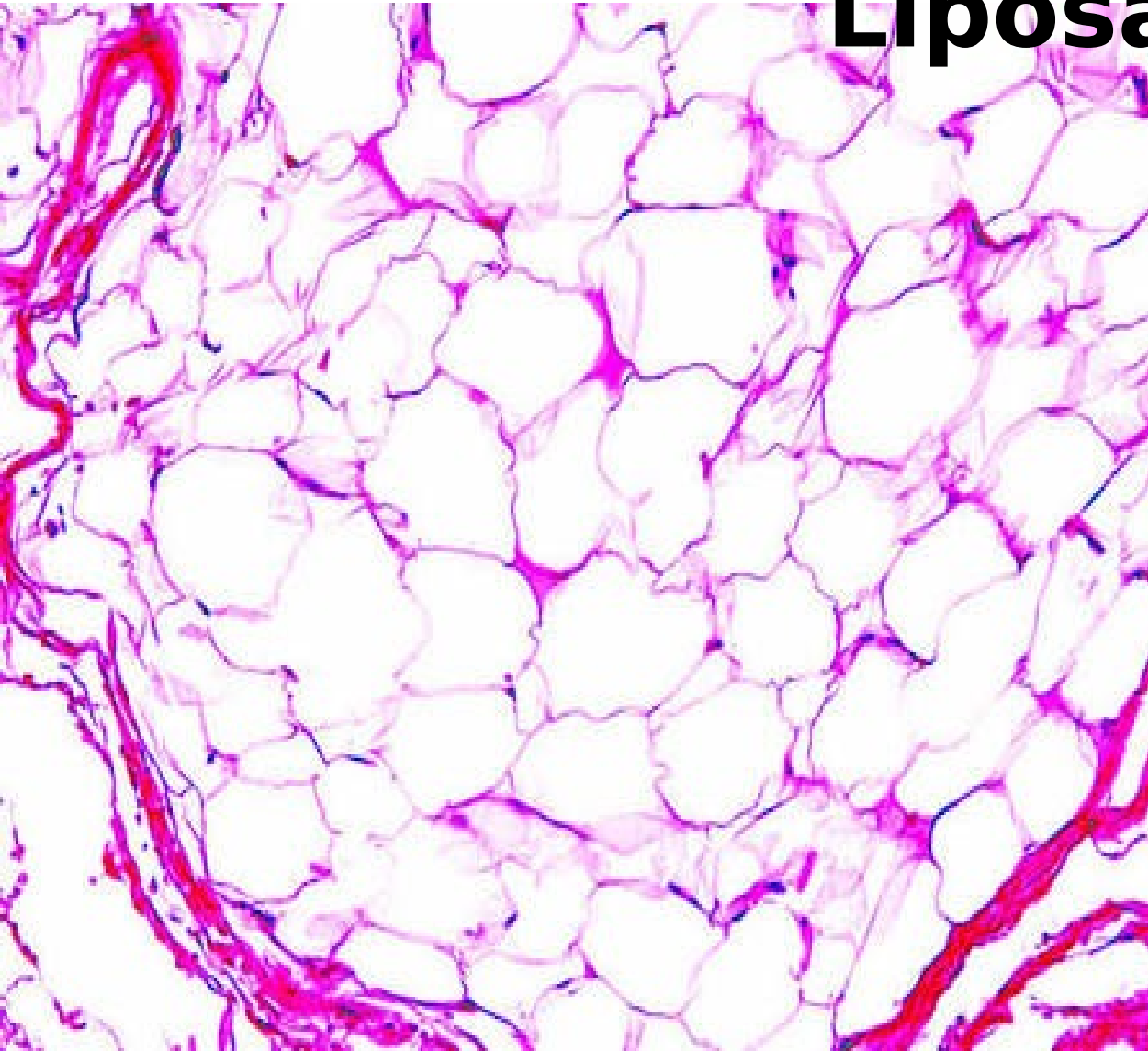
Lipoma

Liposarcoma

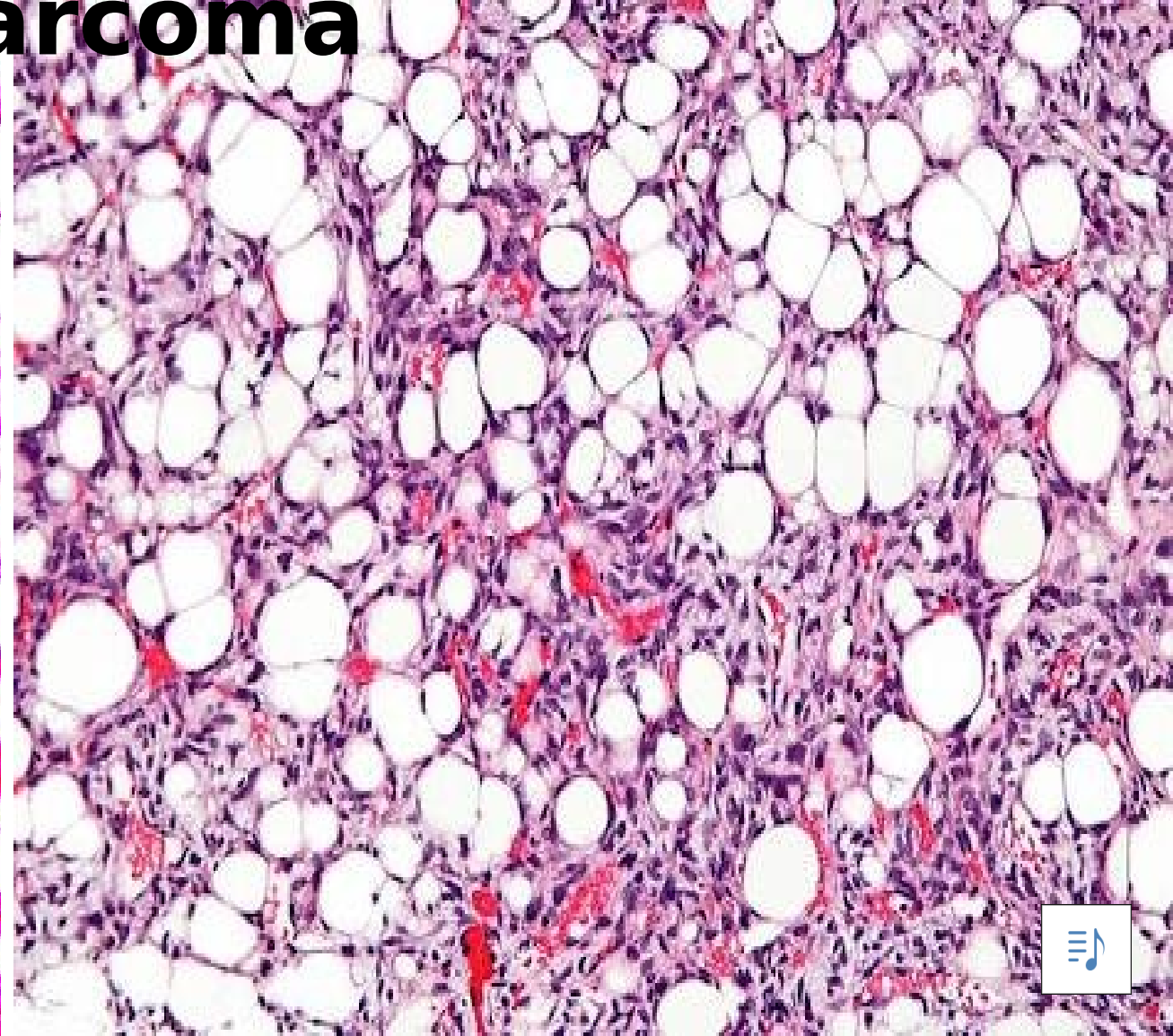


TUMORS OF ADIPOSE TISSUE

Lipoma



Liposarcoma



TUMORS OF FIBROUSTISSUE

- **Fibromas**: uncommon **benign** tumor of fibrous tissue.
- It may arise in the dermis, ovary, and GIT.
- **Gross picture**: **well defined** **capsulated** **firm** mass with **whorled** grayish cut section.
- **Microscopic picture**:
It is formed of proliferated **fibroblasts** and **collagenous stroma**.



FIBROMA

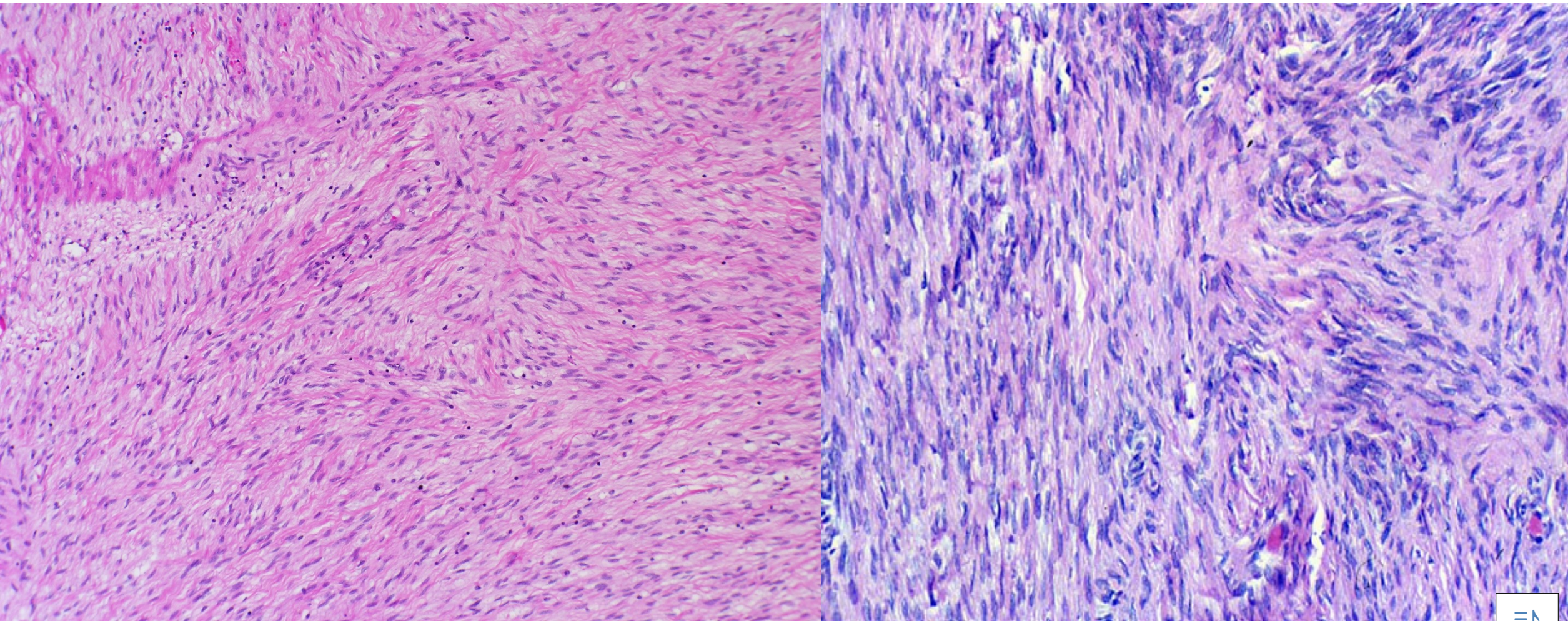
Capsulated

Well defined

Firm mass with **whorled**
grayish cut section.



FIBROMA



SMOOTH MUSCLE TUMORS

1. Leiomyoma: benign smooth muscle tumors.

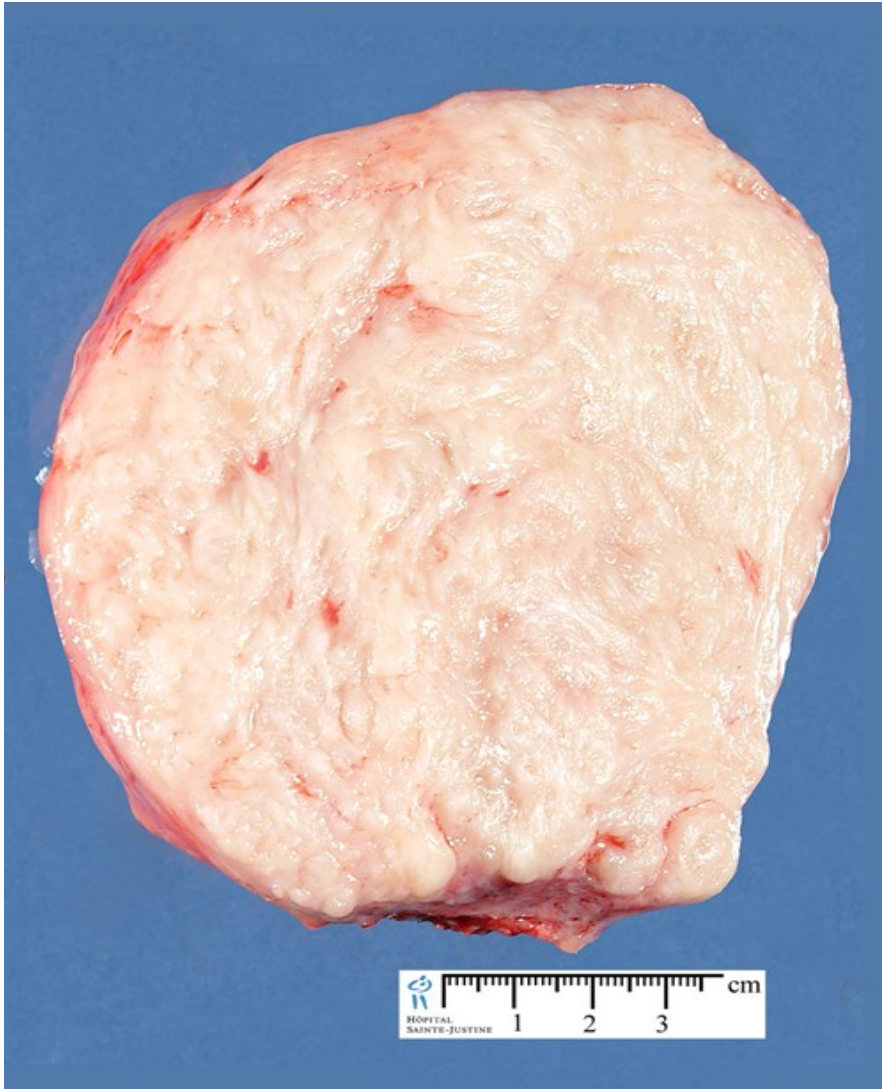
They are common in the **uterus**, and **gastrointestinal tract**.

2. Leiomyosarcoma: rare malignant smooth muscle tumors. Can occur in the uterus, and stomach. Present grossly by a **large bulky fleshy mass** with wide areas of hemorrhage and **necrosis**.

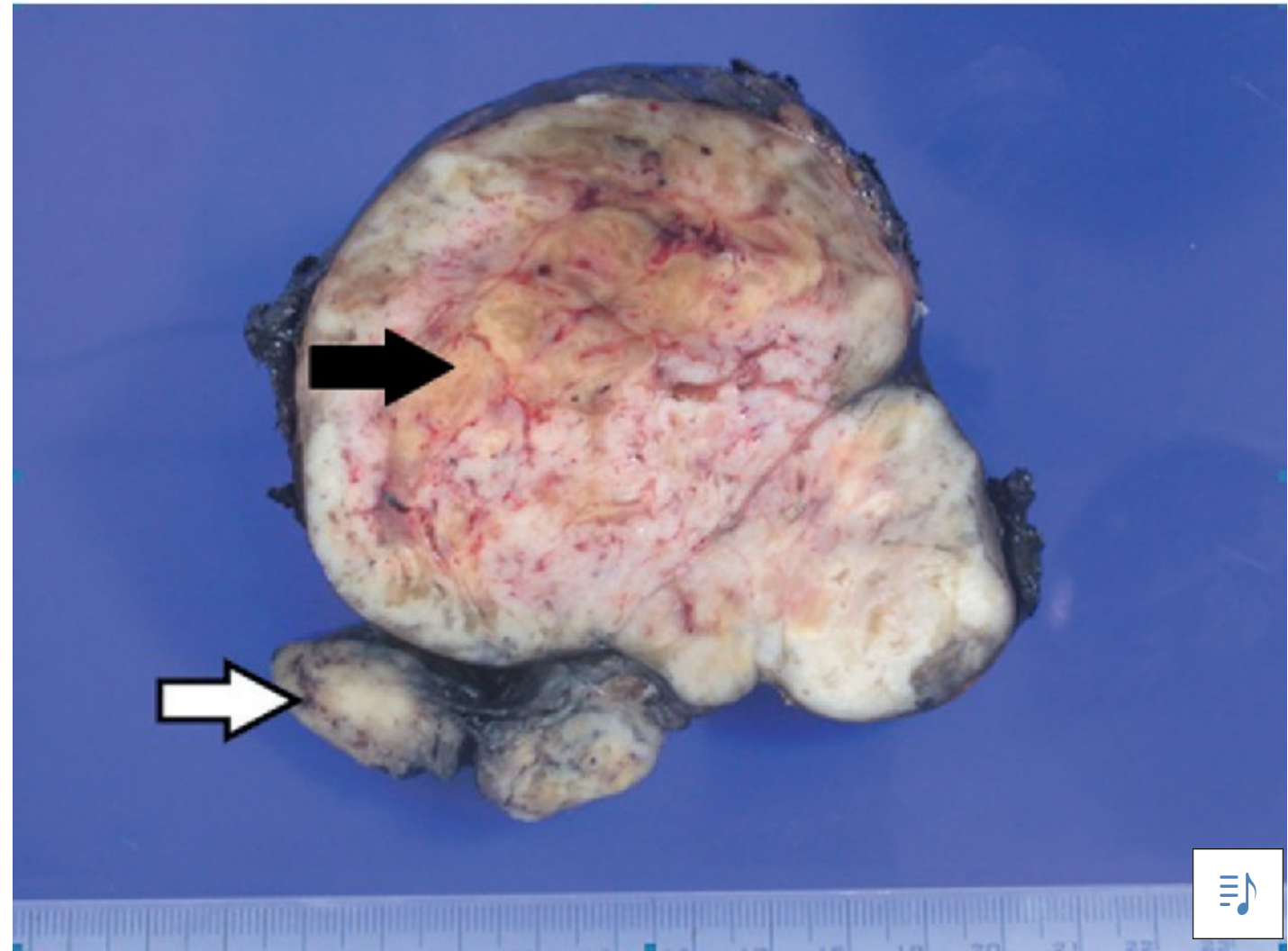


SMOOTH MUSCLE TUMORS

Leiomyoma



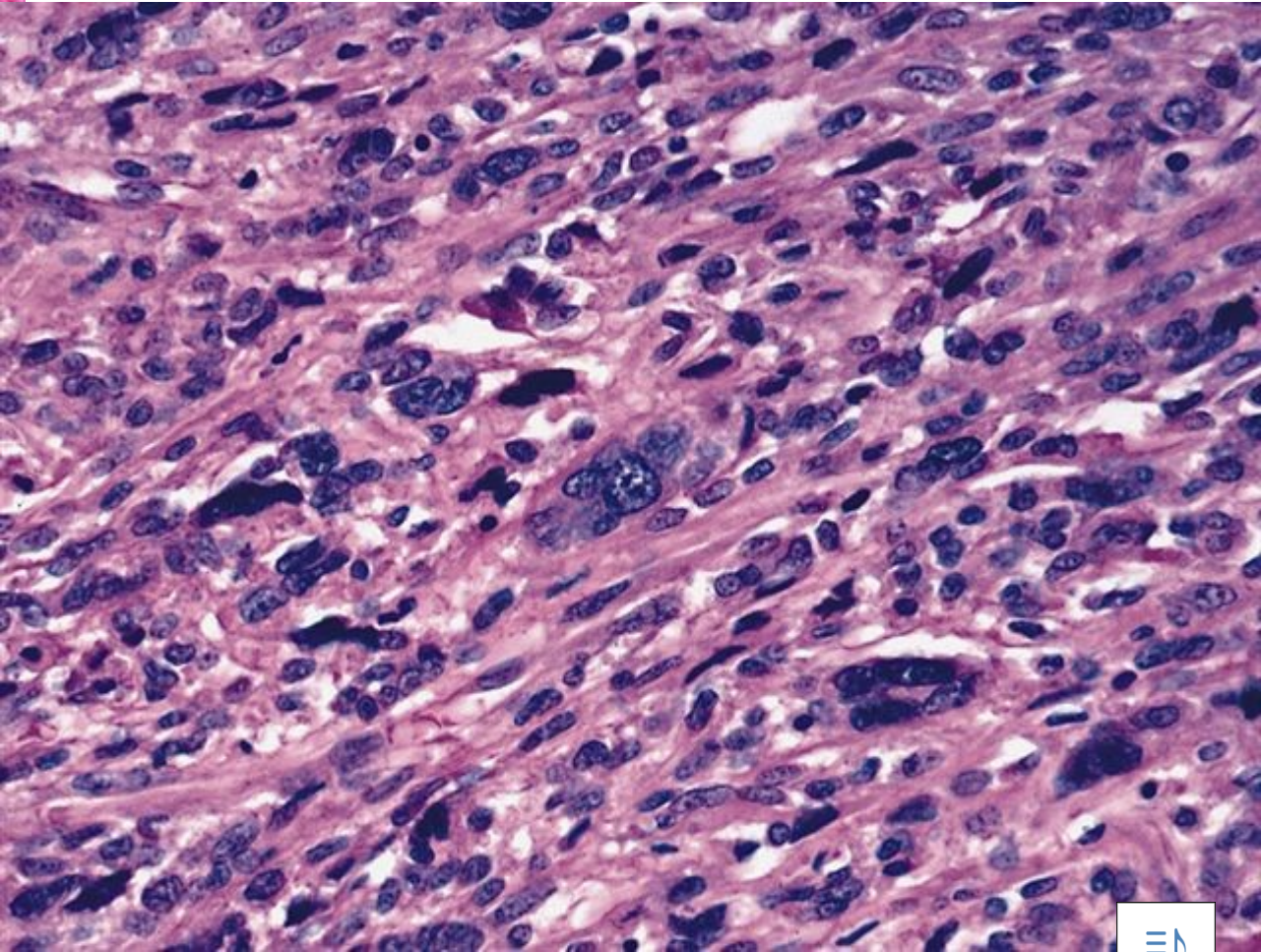
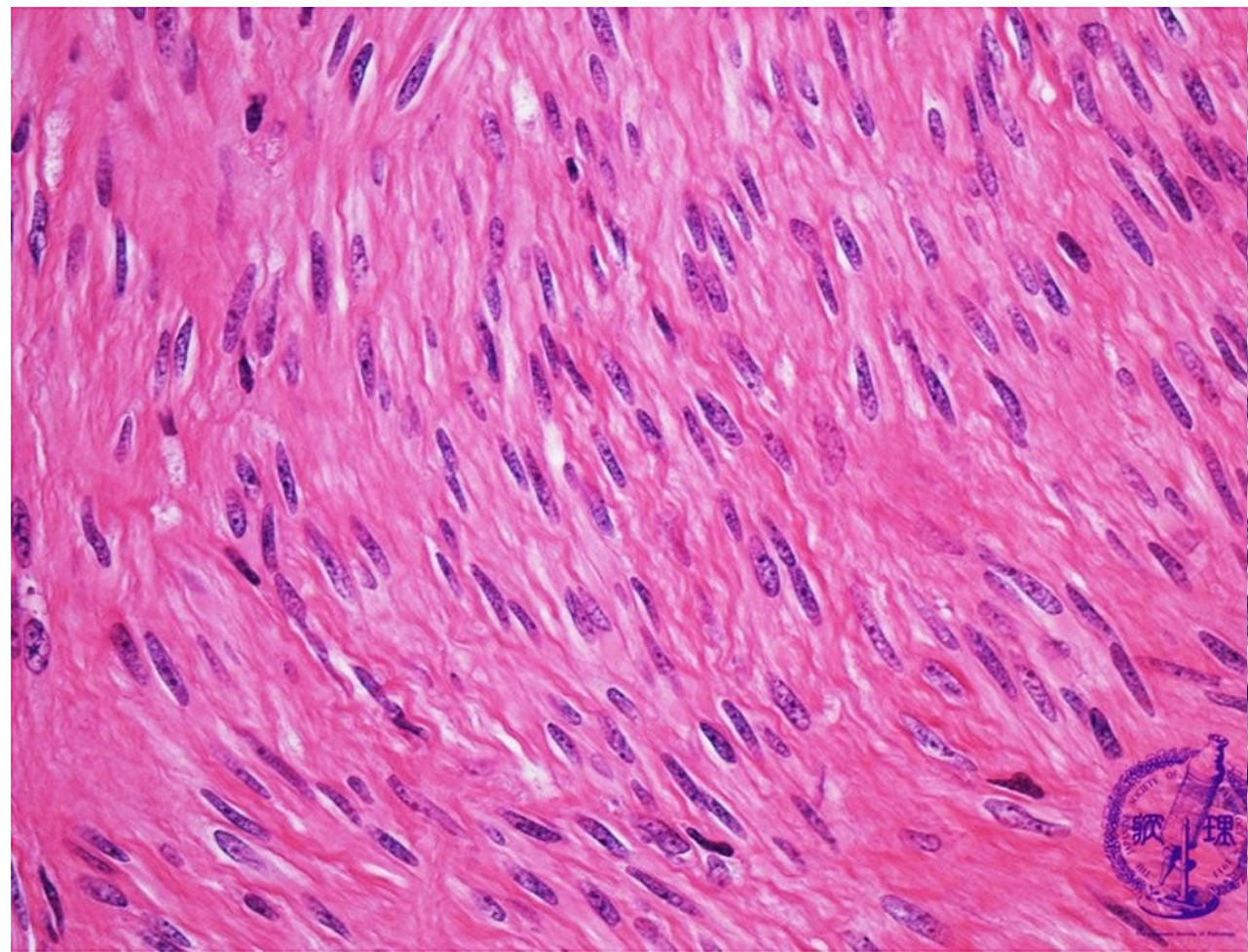
Leiomyosarcoma



SMOOTH MUSCLE TUMORS

Leiomyoma

Leiomyosarcoma



Benign vascular tumors

1- Hemangioma: Benign vascular tumor formed of vascular spaces filled with blood commonly seen in infants or children.

- It has two histologic variants:
 1. Capillary hemangioma: **the commonest type**
 2. Cavernous hemangioma.
- **Gross:** It is well defined non capsulated tumor.
- **Microscopic:** It is formed of capillary sized or large vascular spaces lined by endothelium and separated by connective tissue stroma.



Hemangiomas

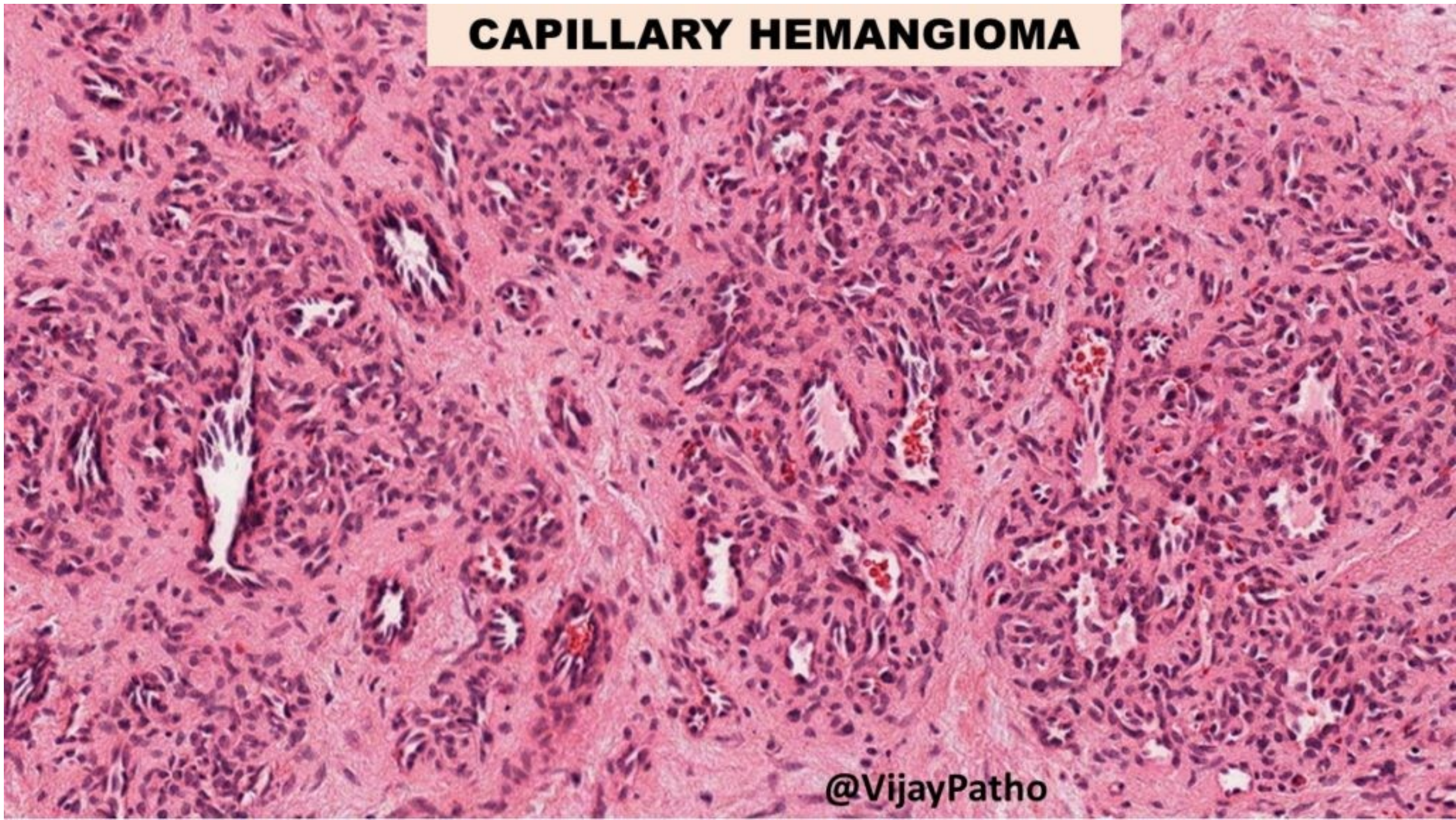
Capillary hemangioma cavernous hemangioma



Cavernous hemangioma



CAPILLARY HEMANGIOMA

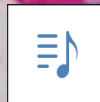


@VijayPatho



CAVERNOUS HEMANGIOMA

Large spaces filled with blood



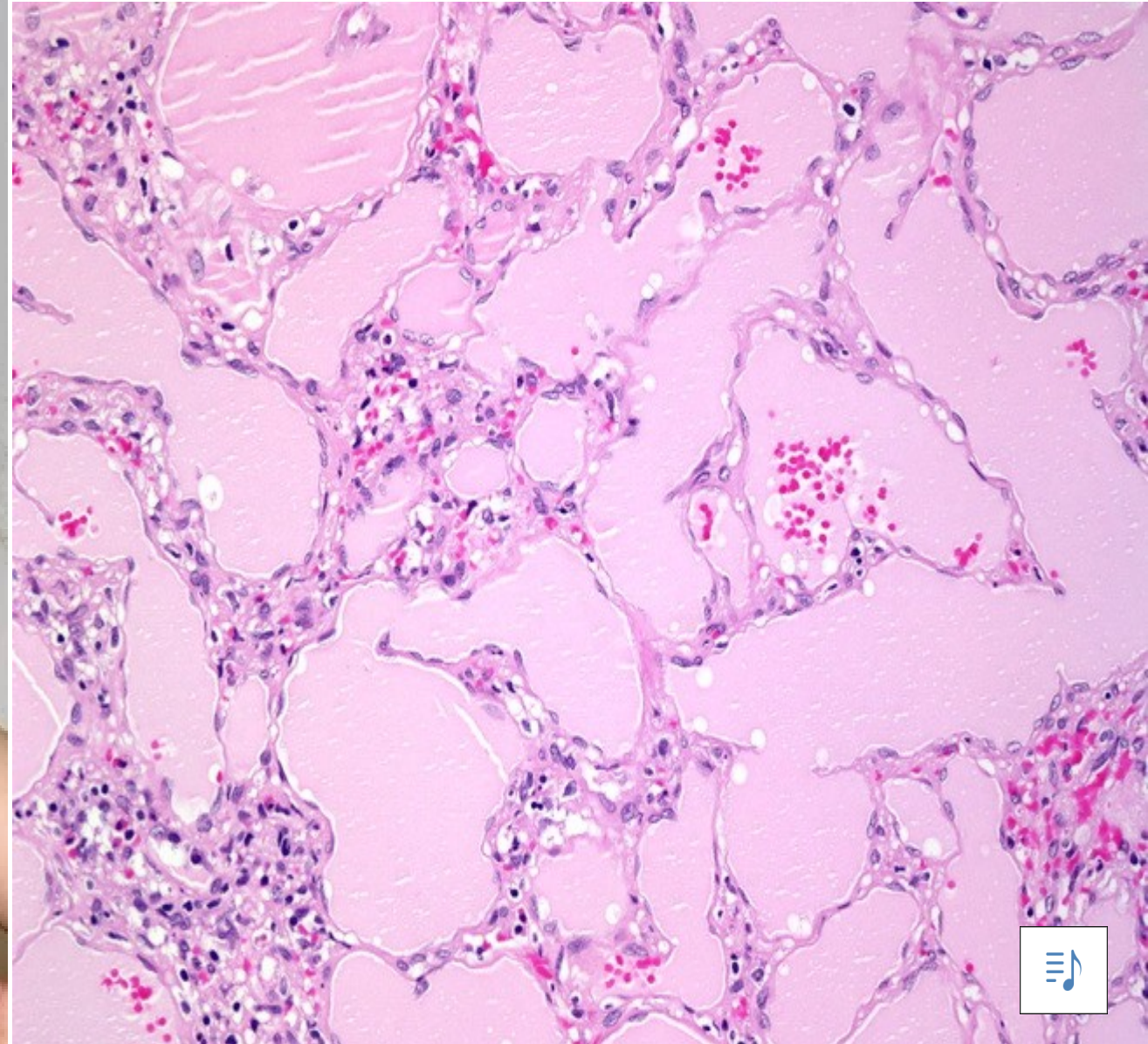
Benign vascular tumors

2- Lymphangioma: Benign vascular tumor formed of lymphatic vascular spaces filled with lymph (not blood) & often congenital.

- It is well defined non capsulated tumor.
- It is formed of capillary sized or large vascular spaces lined by endothelium and separated by connective tissue stroma rich in lymphocytes.



Lymphangiomas (cystic hygroma)



Lecture Quiz



An autoimmune disease that is characterized by auto-antibodies against acetylcholine receptors is:

- Duchenne muscle dystrophy
- Myasthenia gravis
- Becker muscle dystrophy
- Polymyositis
- Dermatomyositis



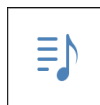
Lecture Quiz



An autoimmune disease that is characterized by auto-antibodies against acetylcholine receptors is:

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- **Myasthenia gravis**
- Becker muscle dystrophy
- Polymyositis
- Dermatomyositis





SUGGESTED TEXTBOOKS



1. Robbins basic pathology, ninth Edition
2. Kaplan step 1 pathology lecture notes 2017 (P.78-98)